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PATENTS

New Attorney Docket No. 38572-0024  
Old Attorney Docket No. 031788-0010

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of: : Group Art Unit: 1714  
Paul J. GLATKOWSKI et al. :  
App. No.: 09/894,879 : Examiner: K. Wyrozebski  
Filed: June 29, 2001 :  
Title: ELECTROMAGNETIC SHIELDING COMPOSITE COMPRISING NANOTUBES

Commissioner for Patents  
United States Patent and Trademark Office  
Washington, DC 20231

Sir:

**Declaration under 37 C.F.R. §1.131**

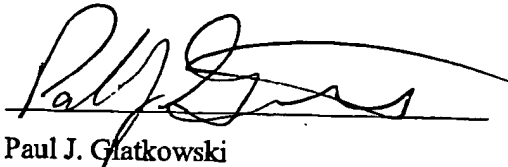
I, Paul J. Glatkowski, am an inventor of the invention disclosed and claimed in the above-referenced patent application.

I conceived and reduced to practice a composite having nanotubes with an aspect ratio which provides the composite with electromagnetic shielding prior to November 4, 1998, and therefore prior to the filing date of U.S. Patent No. 6,280,677 to Yakobson (Yakobson), as evidenced by the documents attached hereto.

Under my direction, tests were performed on composites containing nanotubes to assess electromagnetic shielding. Briefly, 1.5 weight percent commercially available nanotubes were incorporated into composites and exposed to radiation at various frequencies and degrees of orientation. The results of are shown in the attached Test Report.

Data in the Test Report was normalized for a thickness of 1 mm and described in Table 2, which shows a shielding effectiveness of 182 dB at a loading level of only 1.5 wt%. Thus, the data shown in Table 2 reveals that the composites clearly offer both electromagnetic shielding and low observability.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the above identified application or any patent issued thereon.

Date: 10/28 2002

Paul J. Glatkowski

Attached: Test Report and Table 2.

**TEST REPORT****SHIELDING EFFECTIVENESS TEST**

NO.	SAMPLE	Effective Thickness, millimeters	SHIELDING EFFECTIVENESS, dB, at Frequency									
			20 kHz	0.4 MHz	15 MHz	0.2-GHz	1.5 GHz					
			$SE_{pw}$	$SE_m$	$SE_{pw}$	$SE_m$	$SE_{pw}$	$SE_m$	$SE_{pw}$	$SE_m$	$SE_{pw}$	$SE_m$
1	9/1 SH	0.56	102	65	101	64	102	65	103	-	103	-
2	NEAT H	1.95	61	33	62	35	63	34	65	-	67	-
3	9/1 H	0.64	73	31	72	33	74	36	76	-	77	-
4	15% Carbon	3.12	106	85	105	86	106	87	108	-	108	-
5	9/1 N	2.23	102	63	102	64	103	65	104	-	105	-

**COMMENTS**

1. The test per ASTM D4935, MIL-STD-209-1991, MIL-STD-1037, MIL-STD-146-121A, MIL-STD-461C and MIL-STD-462.
2. Test conditions: T=22°C, RH=39%, P=101.7 kPa.
3. Each magnitude of the plane wave ( $SE_{pw}$ ) and magnetic ( $SE_m$ ) shielding effectiveness in the table above is an average from six (six) runs of the test at a given frequency. The experimental error evaluated by the partial derivatives and least squares methods does not exceed 6%.
4. The linear arrangement of the generator and receiver antennas and the samples under test meet the requirements of MIL-STD-188-125A and the EM Performance Test Plan C/PMS-38PKT-39X001 02-10-94.
5. INSTRUMENTS AND DEVICES USED
  - Generators: Model E5DA HP (0.5 MHz to 110 MHz) and Model B673 HP (50 MHz to 10 GHz)
  - Analyzers: Model B592B HP and B593E HP (both 9 MHz to 22 GHz)
  - Oscilloscope 10-4540 MX, Nanometer J503 RI with Metrologic Laser ML069S/C N11
  - Antennas: HP1196BC, HP1196CE, HP1196CF; Dipole Antenna Set HP1196BH
  - Magnetic Field Pickup Coil HP11966X, Active Loop H-field HP11966A
  - Dual Preamplifier HP0447F
  - Goniometer J501-03 F-OM, Micrometer Hoeselwerk (10000 m), Sterrett Dial Indicator 25-103 (1270 m)

6. The equipment listed above meets the applicable NIST, ASTM, OSHA and State requirements and was calibrated with the standards traceable to the NIST. The calibration was performed per ISO 9001 §4.11, ISO 9002 §4.10, ISO 9003 §4.6, ISO 9004 §13, MIL-STD-45662, MIL-I-45208, IEEE-STD-498, NAVAIR-17-35/MTL-1, and CSP-1/03-93.
7. The equipment used in the test passed a periodic accuracy test in June 1997. The linear and angular measuring instruments were calibrated in December 1997. Next test - June 1998.

Table 2

Sample Loading and Shear	Thickness	Shielding Effectiveness Test, dB, at Frequency									
		20 kHz		0.4 MHz		15 MHz		0.2 GHz		1.5 GHz	
		SE <sub>pw</sub>	SE <sub>m</sub>	SE <sub>pw</sub>	SE <sub>m</sub>	SE <sub>pw</sub>	SE <sub>m</sub>	SE <sub>pw</sub>	SE <sub>m</sub>	SE <sub>pw</sub>	SE <sub>m</sub>
Requirement		100		100		100		100		100	
1.5 wt% NT H	1 mm	182	116	180	114	182	116	184	-	184	-
1.5 wt% NT M	1 mm	114	48	113	52	116	56	119	-	120	-
1.5 wt% NT N	1 mm	46	28	46	29	46	29	47	-	47	-
Neat PET	1 mm	31	17	32	18	32	17	33	-	34	-

SE<sub>pw</sub> = plane wave; SE<sub>m</sub> = magnetic; H = high shear; M = medium shear; N = no to low Shear